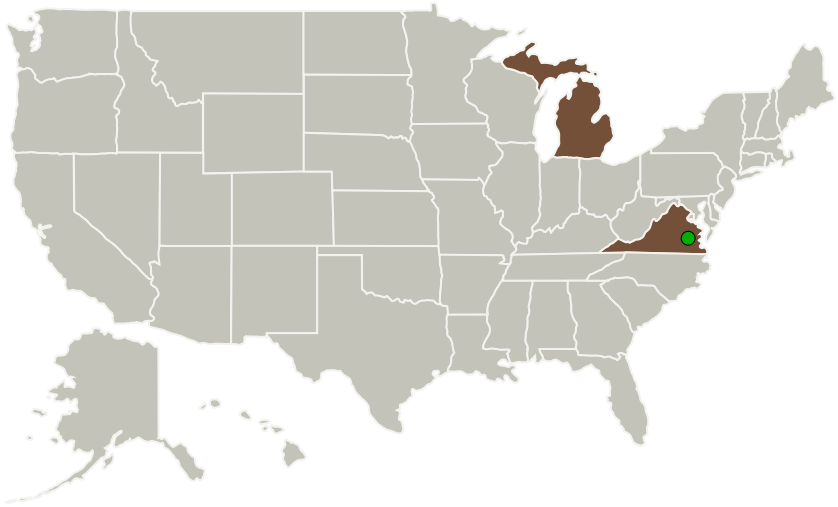
RIDES: Raman Icing Detection System, Phase II

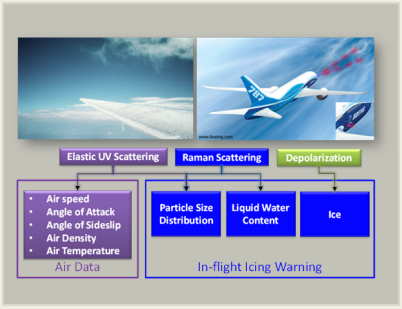
Completed Technology Project (2014 - 2017)

Project Introduction

Inflight icing of engines and airframe presents a significant hazard to air transport, especially at lower flight elevations during take-off or on approach. Ice accretions on the wings affect the smooth flow required for proper lift. A thin layer of coarse ice can reduce the lift by 30 percent and increase drag by up to 40 percent. In addition, accretions can also reduce the air intake in engines and affect readings from a (heated) Pitot tube. Michigan Aerospace Corporation (MAC) proposes to continue the development of an integrated LIDAR instrument capable of identifying icing conditions while also allowing for air data sensing as well as other hazard detection capabilities. The resulting Raman Icing Detection System (RIDES), when coupled with MAC's optical air data solution, will provide unprecedented situational awareness and aircraft safety. The proposed solution will operate without protrusions into the flow, behind a common flush-mounted window on the skin of the aircraft, mitigating the risk of ice build-up during operation and therefore providing a critical redundancy through dissimilar measurement of air data parameters while greatly enhancing a pilot's awareness of potential icing hazards. MAC will build on its successful Phase I trade-study and design effort through the fabrication and demonstration of a Phase II prototype in an icing wind tunnel.

Primary U.S. Work Locations and Key Partners





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Completed Technology Project (2014 - 2017)

Organizations Performing Work	Role	Type	Location
Michigan Aerospace Corporation	Lead Organization	Industry	Ann Arbor, Michigan
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Michigan	Virginia

Project Transitions

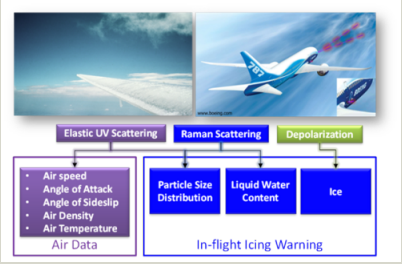
April 2014: Project Start

May 2017: Closed out

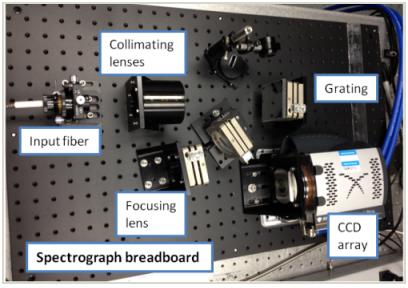
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137414)*

Images



Briefing Chart Image
RIDES: Raman Icing Detection System, Phase II
(https://techport.nasa.gov/image/128354)



Final Summary Chart Image
RIDES: Raman Icing Detection System, Phase II Project Image
(https://techport.nasa.gov/image/135935)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Michigan Aerospace Corporation

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Dominique Fourguette

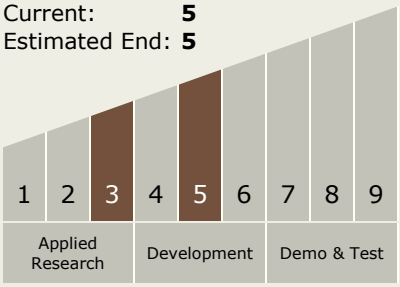
Co-Investigator:
Dominique Fourguette

RIDES: Raman Icing Detection System, Phase II

Completed Technology Project (2014 - 2017)

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.3 Aero Propulsion
    - TX01.3.11 Engine Icing

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System